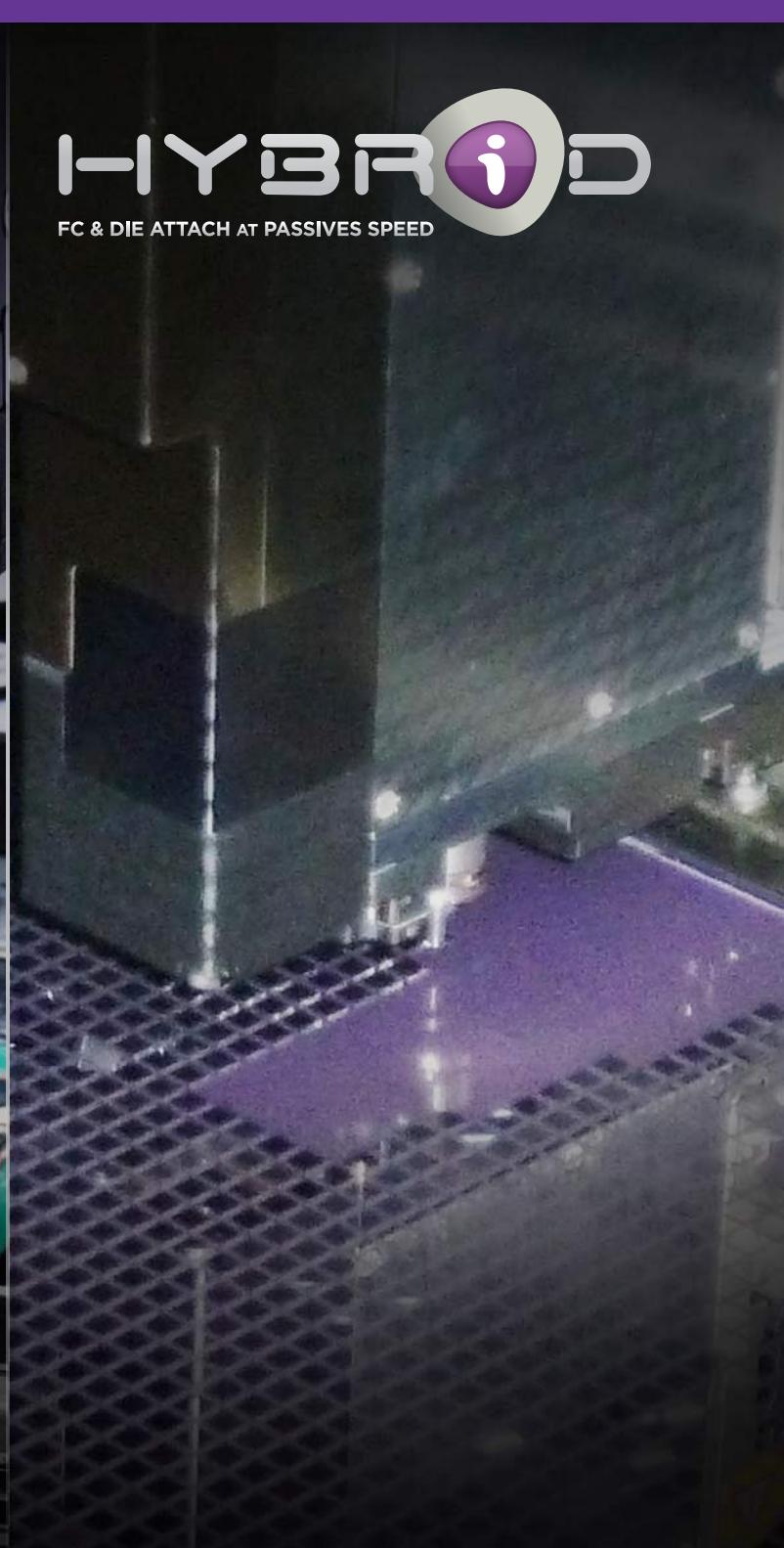
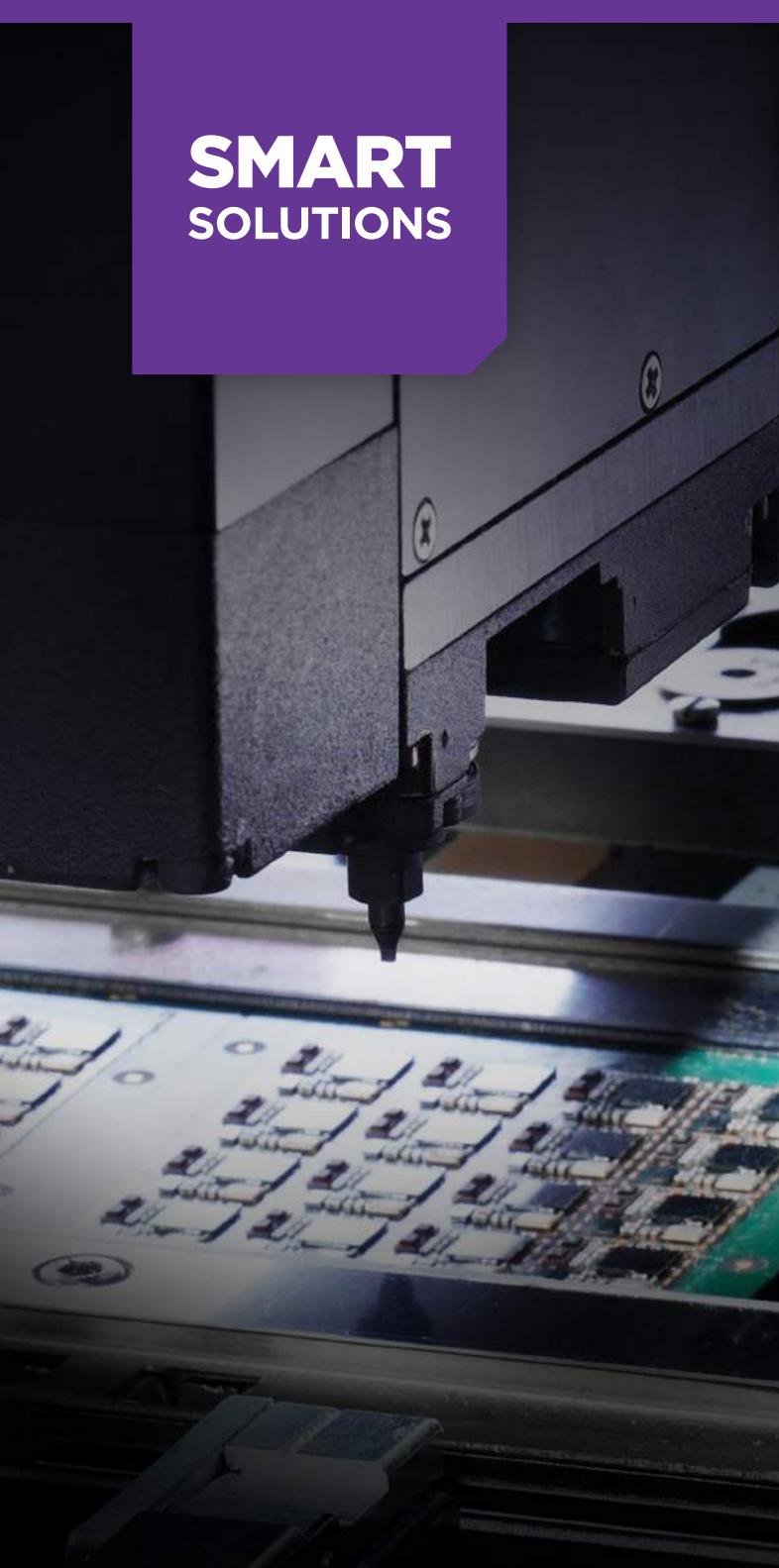


**SMART
SOLUTIONS**

HYBRID
FC & DIE ATTACH AT PASSIVES SPEED



K&S HYBRID

The best solution for Flip Chips, Die Attach, WLP, Modules,
SiP, MEMS, and other advanced packages

K&S HYBRID WITH WAFER FEEDER

COMBINES FAST AND ACCURATE FLIP-CHIP WITH PASSIVE PLACEMENT



Kulicke & Soffa's **Hybrid** combines high-accuracy Flip-Chip bonding directly from wafer with ultra-high-speed chip shooting, ideal for System-in-Package and other advanced package production. Flip-Chip placement up to 27,000 units per hour (UPH), passive component placement up to 121,000 UPH (IPC-9850 standard) or any combination in between. Flip-Chip placement can achieve better than 7 µm accuracy, while passive components can achieve better than 25 µm accuracy.

The Hybrid wafer feeder brings all the advantages of SMD manufacturing to back-end semiconductor processing: high-speed component placement, single-pass, rather than batch processing and through its fully controlled pick-and-place process delivers ultra-low placement defect levels; below 1 dpm (defects per million placements).

The unique parallel placement concept provides a configurable, easily exchangeable robot selection, bringing on one single tool, cost competitive placement for high-performance Flip-Chip or bare dies and at the same time cost competitive placement for low cost SMD's. Other high-end bonding equipment being utilized for low cost SMD's are not considered competitive compared with high volume SMD machines. The Hybrid tool combines the best of both worlds allowing the use of one single tool instead of two individual tools. That cuts capital investment, running costs, and cleanroom floor space.

Unrivaled application flexibility

The Hybrid's application flexibility is unseen in the industry. It can be easily reconfigured (including recipe change, transport, feeder set-up) switching production between SiP / MCM / FC-BGA / modules, embedded/ RFID / smartcards, POP, memory, Fan-Out WLP, and regular SMT. This is not an option on other machines requiring major reconfiguration and downtime.

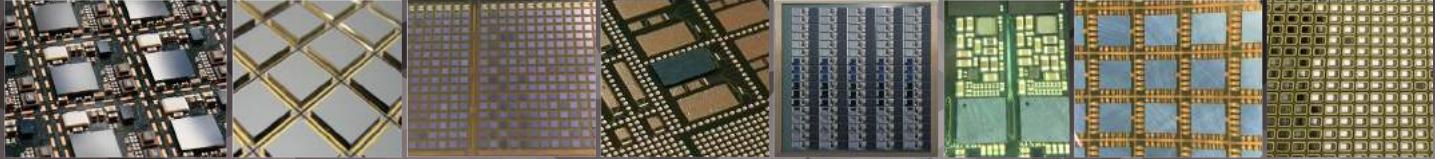
Reduces PCB complexity and system costs

The SiP market is growing fast, with all the major OSAT, EMS, ODM and OEM players now considering SiP manufacturing. It reduces PCB complexity and system costs, and increases reliability of electronic components for automotive systems, mobile phones, wearables and internet-of-things devices.

The K&S Hybrid is the first hybrid flip chip/passive placement machine with the speed and accuracy needed for cost-effective SiP manufacture. That provides a huge advantage to module makers.



BASIC FEATURES

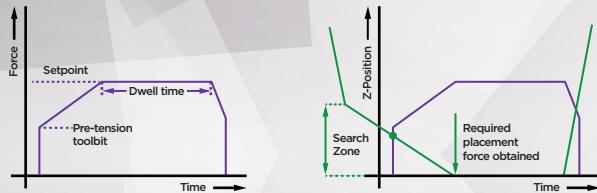


Examples of products that can run on the Hybrid without major configuration changes



Single Pick, Single Place

Having full control of your process requires handling one component at a time. All steps from look-before-pick to pick, motion, place and look-after-place can be fully optimized, controlled, verified and dedicated to that single component, making it the most reliable process possible in the industry.



Controlled Pick and Place Process

Closed-loop active-force feedback control at every pick-and-place action:

- Full downward speed until search zone;
- Reduced speed until contact with PCB is detected;
- Verification of placement force against specified value;
- Placement force build-up towards set static force; and
- With continuous generation of board surface-height maps, the advanced closed loop verification process verifies that all placements are according to the specified parameters, and warns the operator in time to avoid possible quality issues



100% component monitoring

During transfer of a component from pick to placement location:

- Components are monitored 'on-the-fly' throughout the entire component transfer movement by means of side-view alignment;
- Vacuum monitoring from pick to place; and
- Components are never rotated after alignment

Error-free production from the very first board

Quality begins before even producing the first board. The right NPI and setup tools ensure that all the boards come out right, the first time:

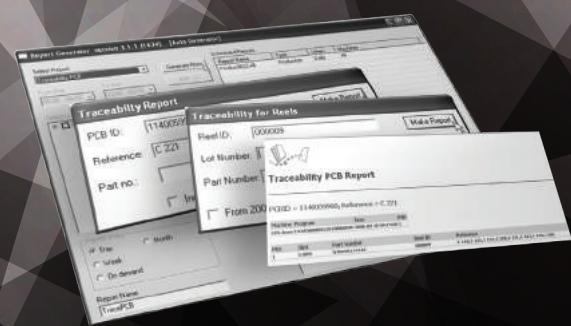
- Generates error-free programs;
- Defines parts and programs once;
- Error-free setups;
- Manages your material;
- Minimizes downtime between jobs;
- Fast feeder preparation;
- Closed-loop parts roundtrip; and
- Reacts fast to last moment NPI changes



100% accurate component traceability

The Setup Assistant guarantees error-free set-ups and enables full traceability:

- Material management;
- Material verification;
- Single barcode scan;
- 100% traceability from source to target material;
- Forced Feeder Re-scan;
- Single barcode scan; and
- Traceability data / report



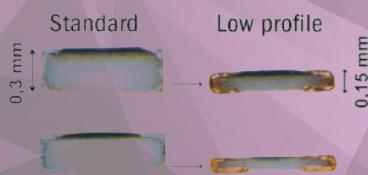
SYSTEMS SPECIFICATIONS



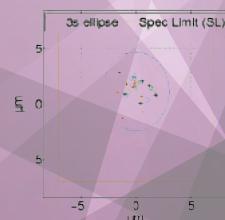
HYBRID 5 Modules

HYBRID 3 Modules

Maximum output components per hour	165 k (121 k IPC 9850)	99 k (79 k IPC 9850)
Maximum output per hour for flip chip bonding (IPC 9850)	10.5 - 16 k cph with dipping 13.5 - 27 k cph without dipping	10.5 - 16 k cph with dipping 13.5 - 27 k cph without dipping
Placement quality	< 1 dpm	< 1 dpm
Placement accuracy @ Cpk > 1	25 µm for Chips / QFP / BGA 18 µm for QFP / BGA 7-10 µm for Flip Chips	25 µm for Chips / QFP / BGA 18 µm for QFP / BGA 7-10 µm for Flip Chips
Minimum component size	0.25 x 0.125 mm (0.010in)	0.25 x 0.125 mm (0.010in)
Maximum component size	45 x 45 mm (1.77 x 1.77")	45 x 45 mm (1.77 x 1.77")
Maximum component height	10.5 mm (0.41")	10.5 mm (0.41")
Placement force range	0.5 - 8 N	0.5 - 8 N
Maximum board size (LxW): - Standard - Optional - Optional (restrictions apply)	515 x 390 mm (20.28 x 15.35") 800 x 457 mm (31.5 x 18") 800 x 525 mm (31.5 x 20.67")	475 x 390 mm (18.7 x 15.35") 800 x 457 mm (31.5 x 18")
Minimum board size (LxW): - Standard - Optional	50 x 50 mm (2 x 2") 50 x 25 mm (2 x 1")	50 x 50 mm (2 x 2") 50 x 25 mm (2 x 1")
Board thickness: - Standard - Optional	≥ 0.3 mm ≥ 0.05 mm	≥ 0.3 mm ≥ 0.05 mm
Maximum tape feeding positions (8 mm): - Single lane feeders - Twin tape feeders	130 260	76 156
Feeding options (special feeders on request)	Tape, waffle pack, tray, wafer, others	Tape, waffle pack, tray, wafer, others
Software interface	CAM-X & SECS / GEM	CAM-X & SECS / GEM
Footprint excluding feeders (L x W)	3,720 x 1,705 mm (146.46 x 67.13")	2,760 x 1,705 mm (108.66 x 67.13")



Low profile components without cracking



Accuracy 7 micron @ 3 sigma

7 µm!

WAFER FEEDER SPECIFICATIONS



HYBRID with 2 Wafer Feeders

HYBRID with 2 Wafer Feeders		
Wafer Feeder	Die size range [mm]	0.5 x 0.5 - 26 x 26 (smaller dies on request)
	Minimum die thickness [μm]	50
	Pick force range [N]	0.5 - 5
	Wafer size [mm]	≤ 300
	Wafer frame size	8 - 12"
	Face down / Face up	Face down / Face up
Output [UPH]	Wafer feeder	9K (die 1 x 1 mm); 27K with 3 Wafer Feeders
Camera	Maximum die size [mm]	26 x 26
	Minimum bump size [μm]	30
Fluxer	Maximum die size [mm]	26 x 26
	Coplanarity check	Yes

Process Control

- Flux level checking
- Fluxer coplanarity check
- Accuracy & Force verification
- Pattern recognition
- Teach Place
- Look before Pick
- Presence check on the fly

MES Capabilities

- Wafer mapping
- Strip mapping
- Material Traceability
- Material Verification Unique Reel ID / AVL Control / RoHS control & MSD control
- LOT management

- Recipe management
- Remote machine control
- Badmark Transfer
- Performance Monitoring
- Process Control
- Process data validation

Services

Maintain your quality

Knowing your service requirements are unique, K&S tailors a service solution to meet your changing needs. K&S is recognized as the industry's premier service provider.

Machine accuracy verification service is one of our services that guarantees the quality of your equipment as long as you have it.

Assessment Services

Recommendations for guaranteed efficiency and yield improvements follow an on-site assessment by K&S.

Start-up and Transition Support

- Training by certified trainers
- Professional, fast installation
- Customized project management and transition

